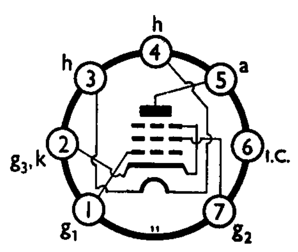


MINIATURE OUTPUT PENTODE 0·3A INDIRECTLY HEATED

N37

APRIL, 1952

BASE CONNECTIONS AND VALVE DIMENSIONS



View from underside of base.

Base :	B7G	
Bulb :	Tubular	
Overall length :	64—70	mm.
Seated length :	58—64	mm.
Max. diameter	19	mm.

RATING

Pentode Connection

I_h	0·3		A
V_h	13	approx.	V
v_{h-k} (pk)	150	max.	V
V_a	165	max.	V
V_{g2}	165	max.	V
p_a	9	max.	W
p_{g2}	3	max.	W
μ at $V_a = V_{g2} = 165$, $V_{g1} = -9$	220		
r_a at $V_a = V_{g2} = 165$, $V_{g1} = -9$	23·2		kΩ
g_m at $V_a = V_{g2} = 165$, $V_{g1} = -9$	9·5		mA/V

Triode Connection

$V_{a, g2}$	165	max.	V
$p_{a, g2}$	12	max.	W
μ at $V_{a, g2} = 165$, $V_{g1} = -9$	10		
r_a at $V_{a, g2} = 165$, $V_{g1} = -9$	835		Ω
g_m at $V_{a, g2} = 165$, $V_{g1} = -9$	12		mA/V

CAPACITANCES (of unscreened valve) :

c_{a-all} 10 pF c_{g1-all} 10 pF c_{a-g1} 0·3 pF

TYPICAL OPERATION

Single Valve. Class A, Pentode Connection

% full input	45	100	100	75	50	%
V_a	100	150	165	165	165	V
V_{g2}	100	150	165	165	165	V
V_{g1}	−4·6	−7·8	−9·3	−10	−11·4 approx.	V
I_a (o)	39	56	53	40	29	mA
I_{g2} (o)	6·5	9·5	9	7·2	5·4	mA
R_k	100	120	150	220	330	Ω
v_{in} (pk)	5	7	8·5	6·7	4·7	V
R_L	2·5	3	3	4	6	kΩ
P_{out}	1·45	3·5	4·1	2·84	2·3	W
D	8·6	11	10	10	10	%

The conditions given in the last two columns are those obtained when the valve is over-biased. They are useful when H.T. power is limited and reduced power output can be tolerated.

Two Valves. Push-pull, Class AB$_1$, Pentode Connection

Data per pair unless otherwise stated.

V_a	100	165	200	250	V
V_{g2}	100	165	165	165	V
V_{g1}	−5	−11·9	−10	−11·2 approx.	V
I_a (o)	70	107	87	66	mA
I_a (max. sig.)	73	110	100	80	mA
I_{g2} (o)	12	18	14	10	mA
I_{g2} (max. sig.)	15	36	25	24	mA
R_k (per valve)	120	150	200	300	Ω
v_{in} (pk) (g_1-g_1)	11	20	25	30	V
R_L (a−a)	3	3	4·5	7·5	kΩ
P_{out}	2·25	9	11·5	13·3	W
D	3·3	4·6	4	4·5	%

Two Valves. Push-pull, Class AB$_1$, Triode Connection

Data per pair unless otherwise stated.

$V_{a,g2}$	165	V
V_{g1}	−10·5 approx.	V
$I_{a,g2}$ (o)	65	mA
$I_{a,g2}$ (max. sig.)	74	mA
R_k (per valve)	330	Ω
v_{in} (pk) (g_1-g_1)	24	V
R_L (a−a)	3	kΩ
P_{out}	2·6	W
D	1·4	%

GRID RESISTOR

The maximum permissible D.C. resistance from control grid to cathode is limited to 0·27 MΩ ±20% for auto-bias and 0·1 MΩ for fixed bias applications.

SCREENING

No internal or external screening is fitted to the valve.

MOUNTING

Any position.

RETAINING

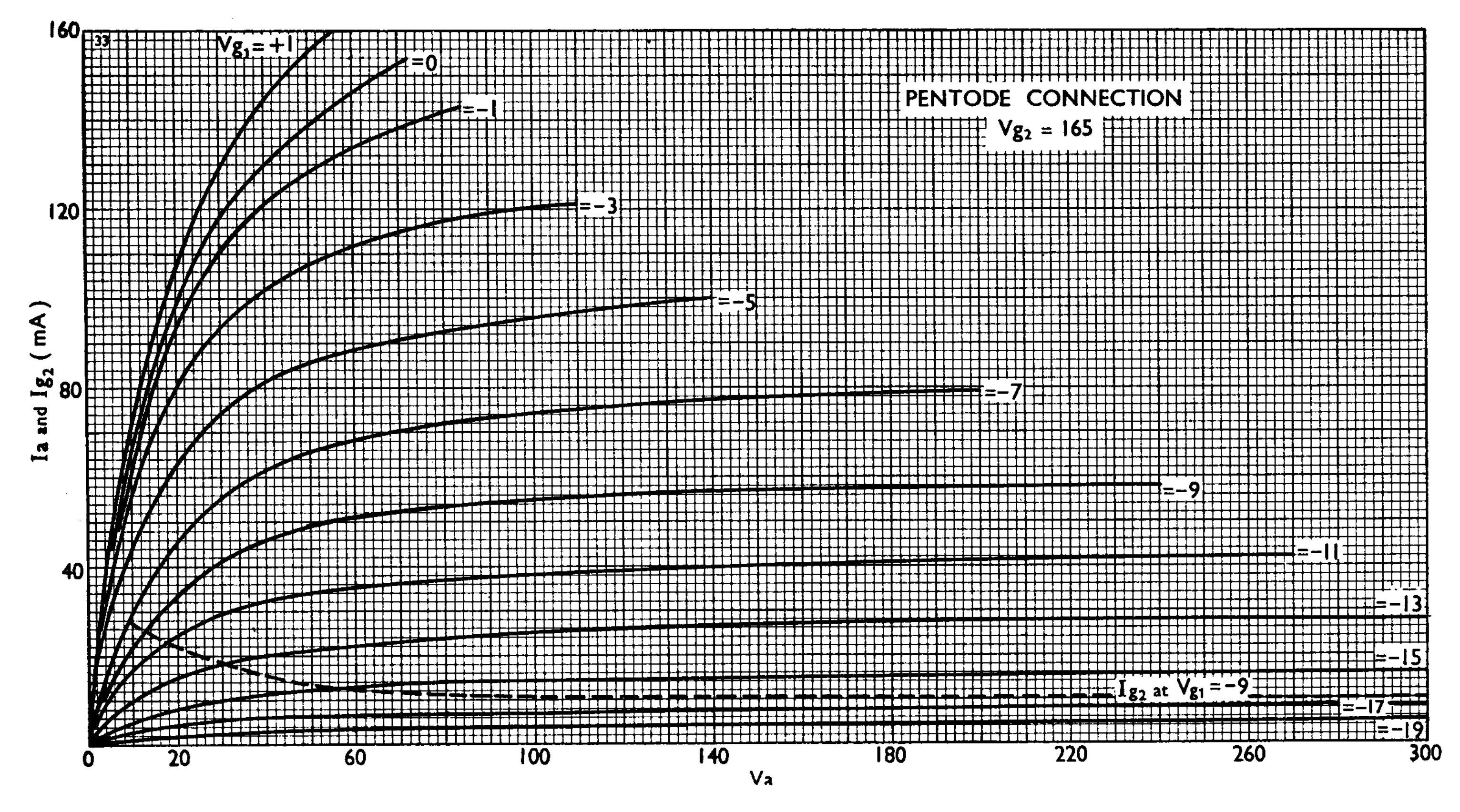
The use of a retaining device is recommended.

VENTILATION

Free air circulation around the bulb is preferable. If a retaining device in the form of a canister is employed, the surfaces should be blackened. The temperature of the hottest part of the bulb must not exceed 250°C.

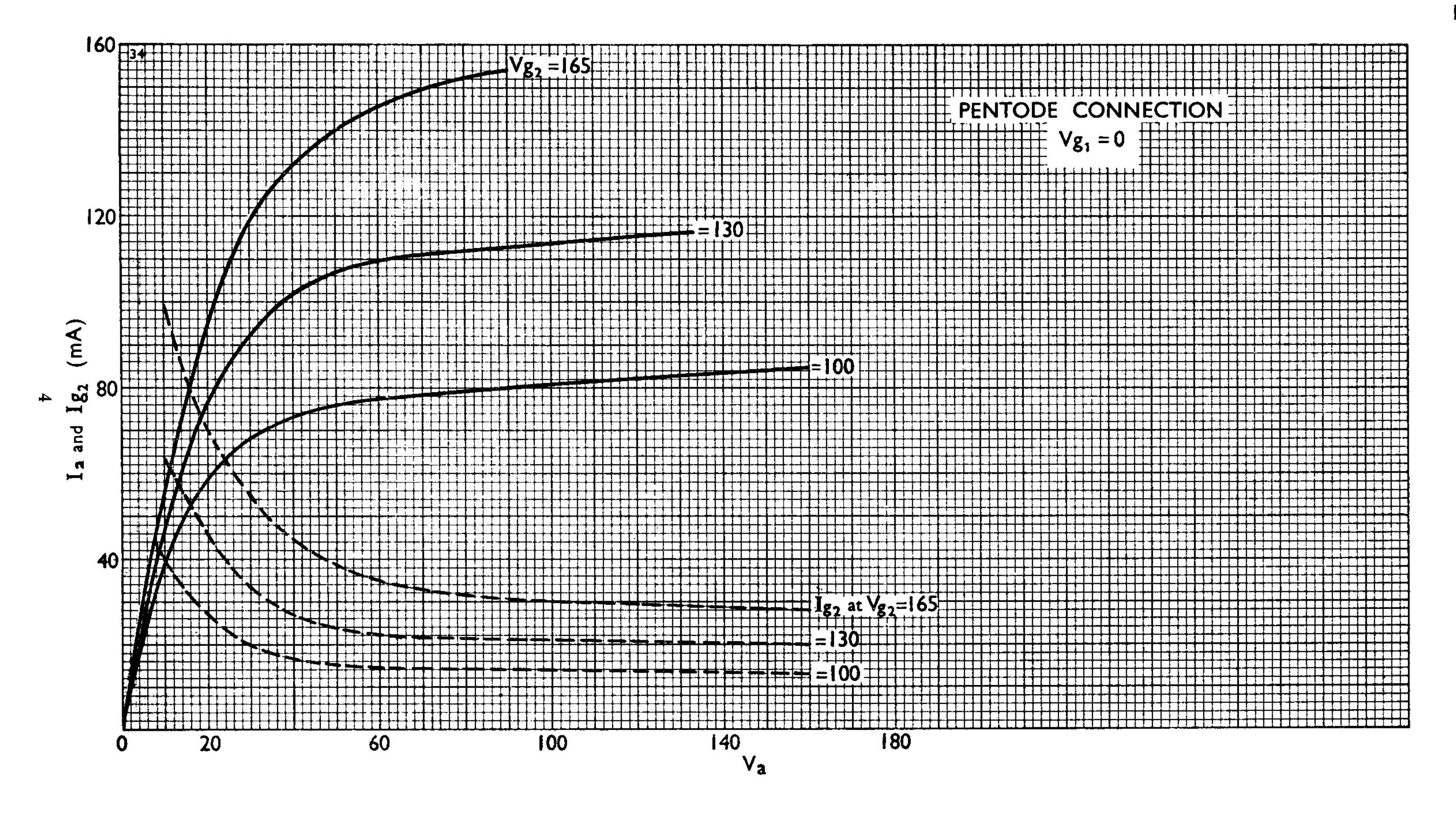
MICROPHONY

Although this is of a very low order, equipment should be designed to minimise microphony.

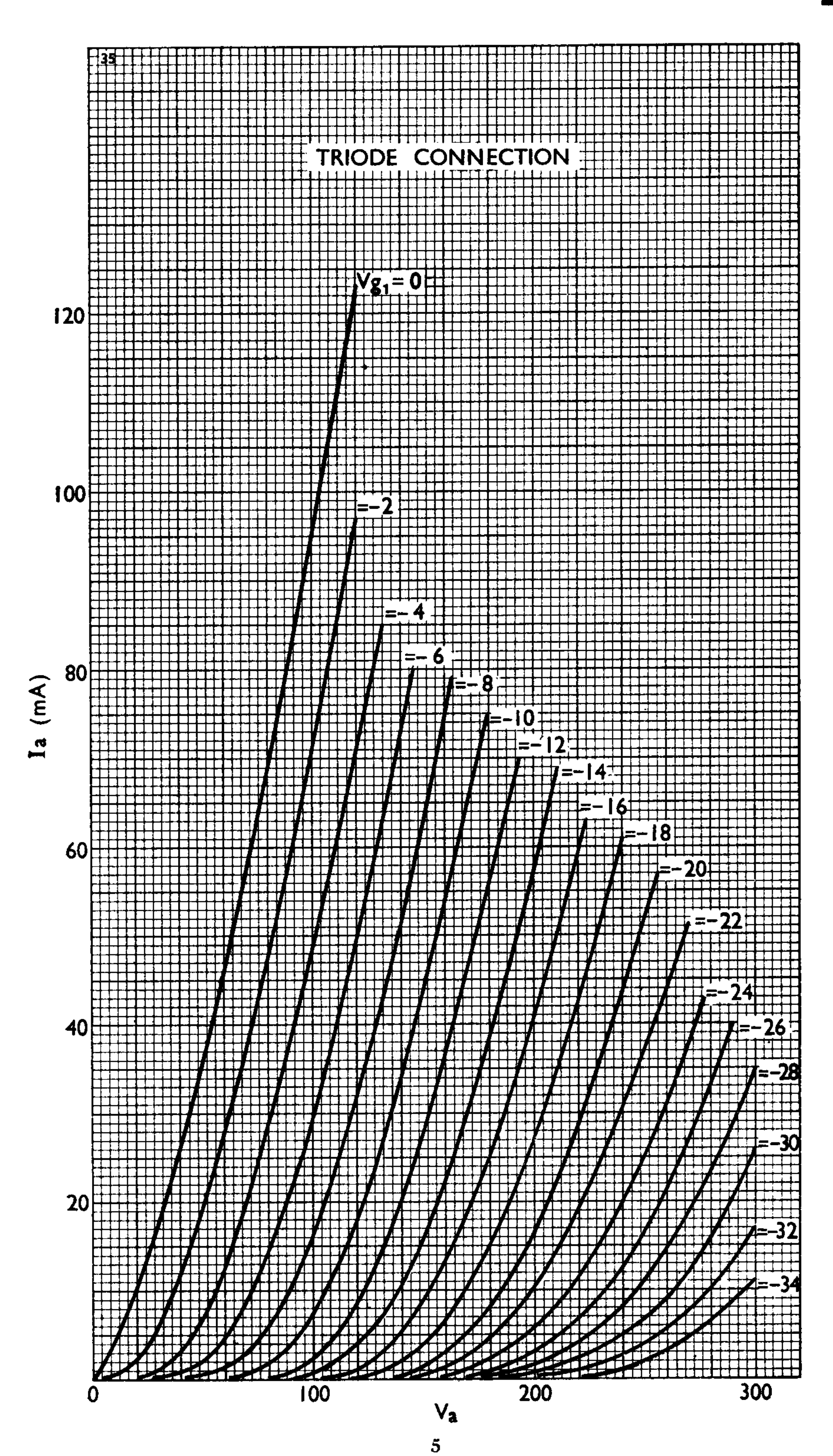


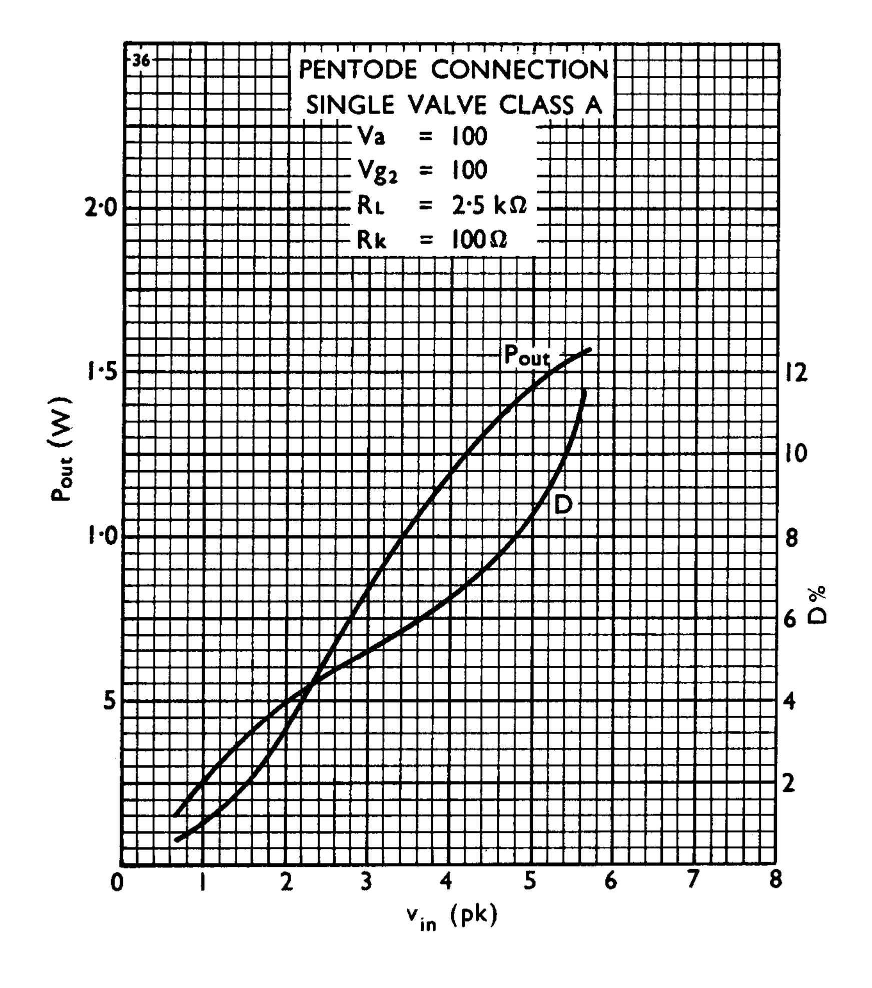
PENTODE CONNECTION
V_{g2} = 165
V_{g1} = +1
=0
=−1
=−3
=−5
=−7
=−9
=−11
=−13
=−15
=−17
=−19
I_{g2} at V_{g1} = −9
I_a and I_{g2} (mA)
160
120
80
40
0
20
60
100
140
180
220
260
300
V_a

N37

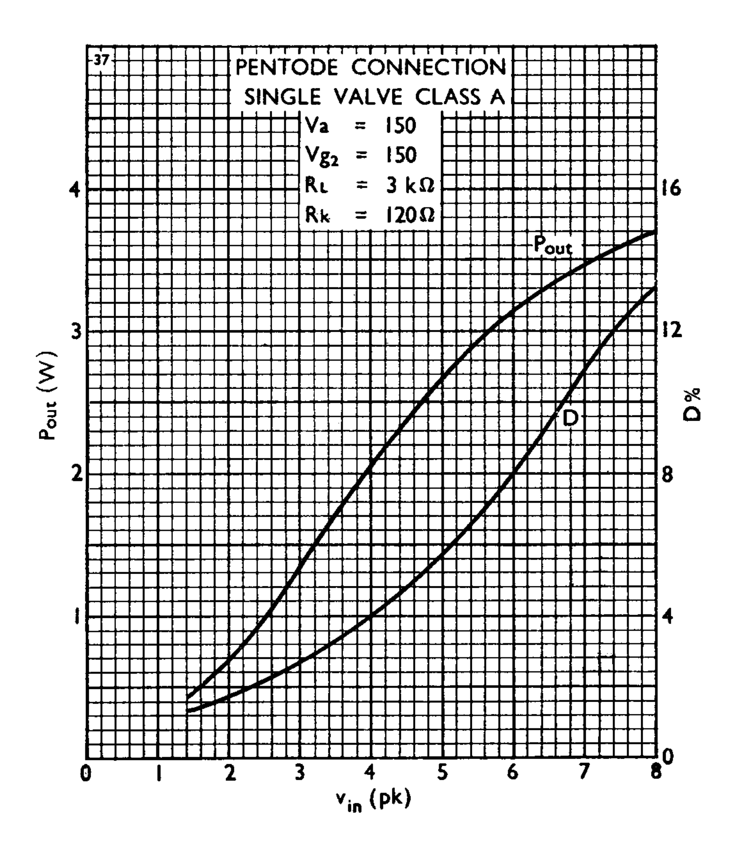


PENTODE CONNECTION
$V_{g_1} = 0$
$V_{g_2} = 165$
$= 130$
$= 100$
I_{g_2} at $V_{g_2} = 165$
$= 130$
$= 100$
160
120
80
40
0
20
60
100
140
180
V_a
I_a and I_{g_2} (mA)

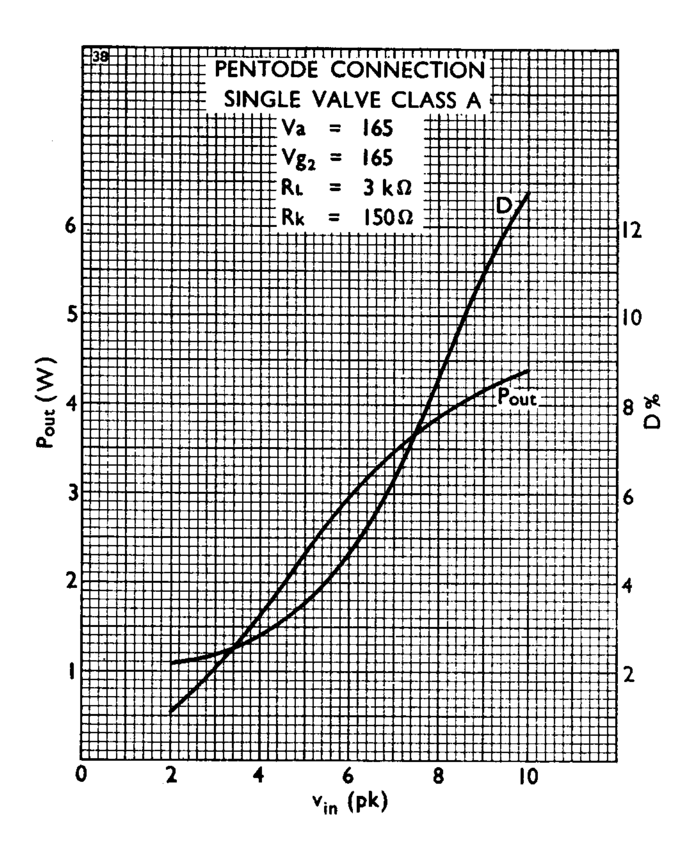

TRIODE CONNECTION
V_{g_1} = 0
=-2
=-4
=-6
=-8
=-10
=-12
=-14
=-16
=-18
=-20
=-22
=-24
=-26
=-28
=-30
=-32
=-34
Ia (mA)
120
100
80
60
40
20
0
100
200
300
V_a



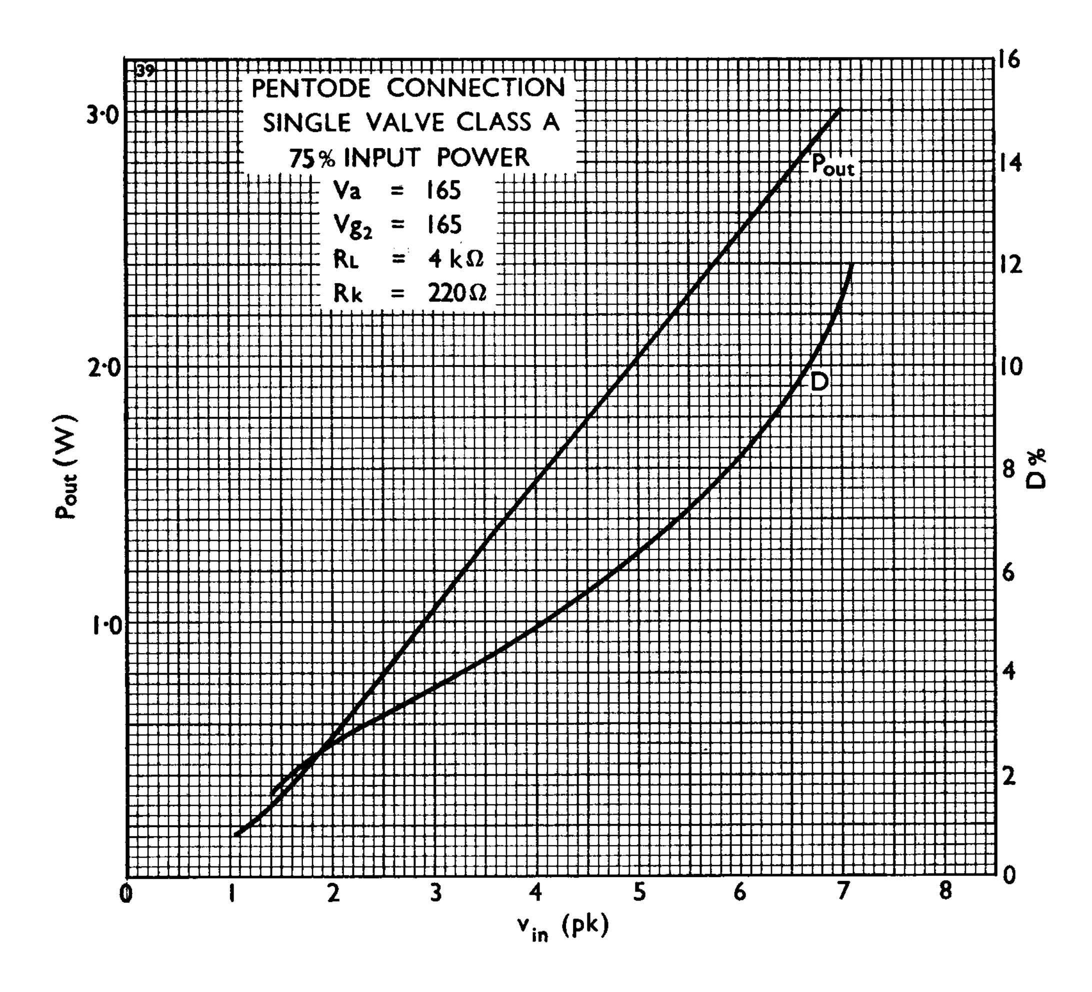
PENTODE CONNECTION
SINGLE VALVE CLASS A
Va = 100
Vg2 = 100
RL = 2·5 kΩ
Rk = 100Ω
36
2·0
1·5
1·0
5
Pout (W)
Pout
D
12
10
8
6
4
2
D%
0
1
2
3
4
5
6
7
8
vin (pk)



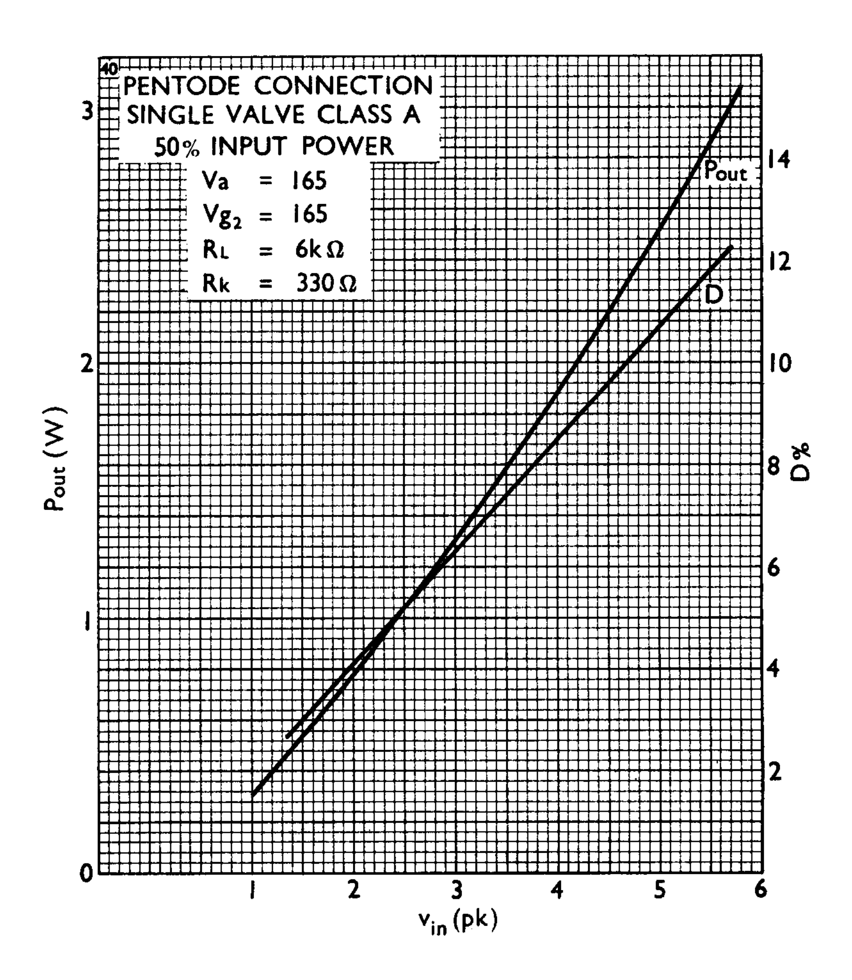
37
PENTODE CONNECTION
SINGLE VALVE CLASS A
Va = 150
Vg2 = 150
RL = 3 kΩ
Rk = 120Ω
Pout
D
Pout (W)
D %
vin (pk)



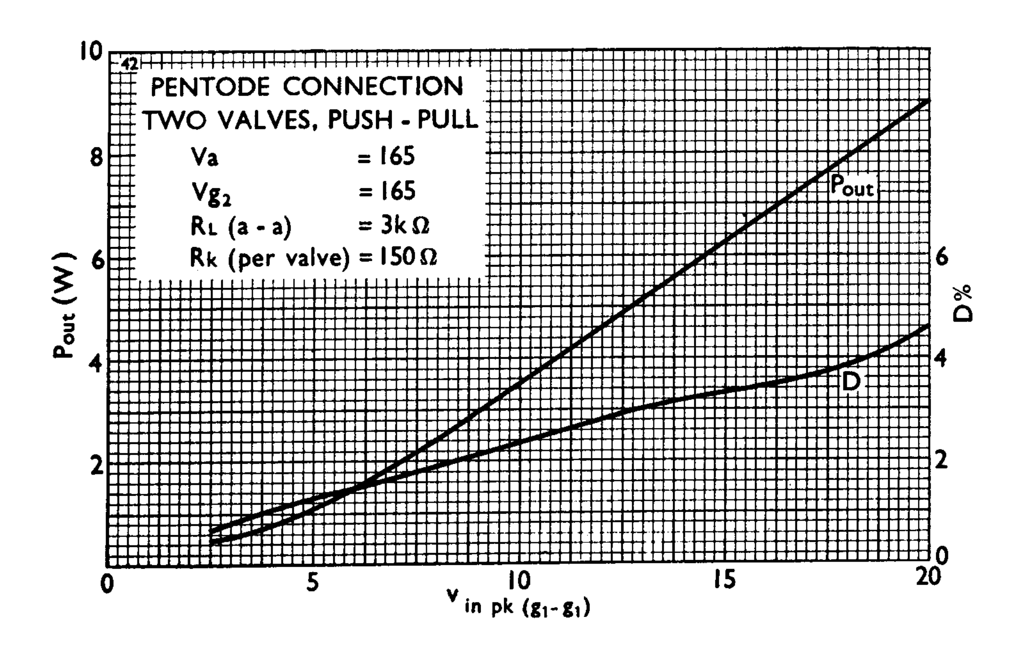
38
PENTODE CONNECTION
SINGLE VALVE CLASS A
Va = 165
Vg2 = 165
RL = 3 kΩ
Rk = 150Ω
D
Pout
Pout (W)
D %
vin (pk)



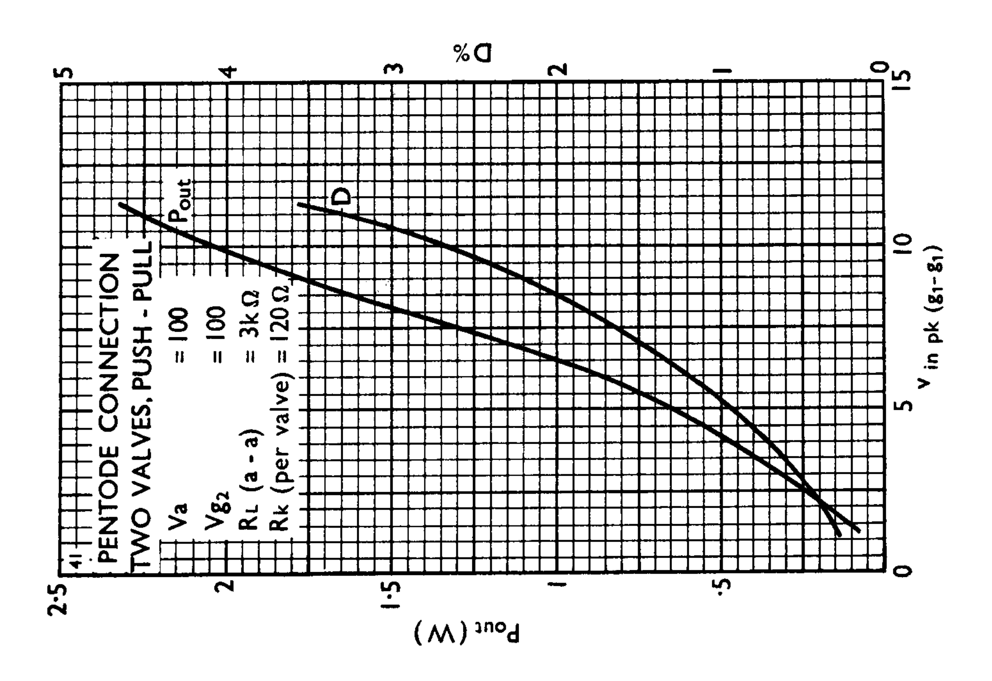
PENTODE CONNECTION
SINGLE VALVE CLASS A
75% INPUT POWER
Va = 165
Vg2 = 165
RL = 4 kΩ
Rk = 220Ω
Pout
D
Pout (W)
3·0
2·0
1·0
D %
16
14
12
10
8
6
4
2
0
vin (pk)
0
1
2
3
4
5
6
7
8
39


PENTODE CONNECTION
SINGLE VALVE CLASS A
50% INPUT POWER
Va = 165
Vg2 = 165
RL = 6k Ω
Rk = 330 Ω
Pout
D
Pout (W)
D%
vin (pk)
0
1
2
3
4
5
6
8
10
12
14
40

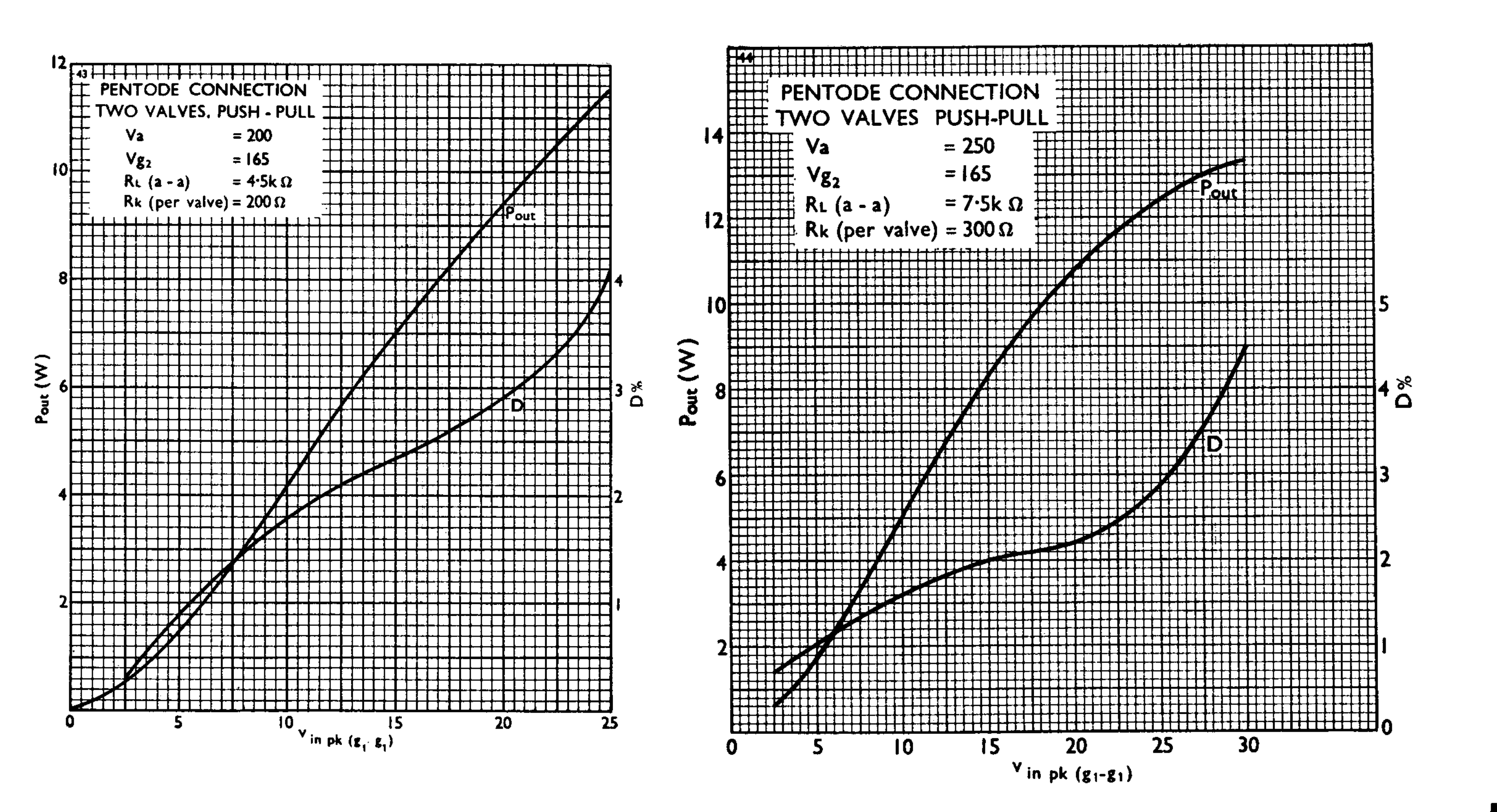
N37

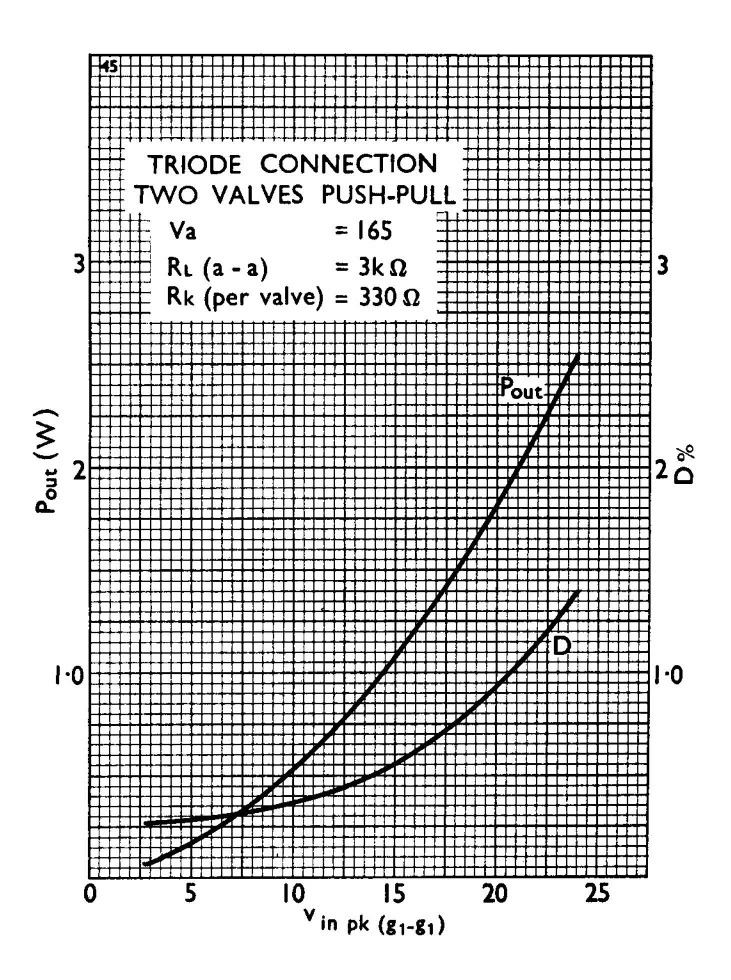


42
PENTODE CONNECTION
TWO VALVES, PUSH - PULL
Va = 165
Vg2 = 165
RL (a - a) = 3k Ω
Rk (per valve) = 150 Ω
Pout
D
Pout (W)
D%
v in pk (g1-g1)
0
5
10
15
20
2
4
6
8
10



41
PENTODE CONNECTION
TWO VALVES, PUSH - PULL
Va = 100
Vg2 = 100
RL (a - a) = 3k Ω
Rk (per valve) = 120 Ω
Pout
D
Pout (W)
D%
v in pk (g1-g1)


43
PENTODE CONNECTION
TWO VALVES, PUSH - PULL
Va = 200
Vg2 = 165
RL (a - a) = 4·5k Ω
Rk (per valve) = 200 Ω
Pout
D
Pout (W)
D %
Vin pk (g1-g1)
44
PENTODE CONNECTION
TWO VALVES PUSH-PULL
Va = 250
Vg2 = 165
RL (a - a) = 7·5k Ω
Rk (per valve) = 300 Ω
Pout
D
Pout (W)
D %
Vin pk (g1-g1)



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